WASTE, TOXICS, AND PESTICIDES MANAGEMENT

Americans enjoy an exceptionally high standard of living. From ice cream to computers, from fast food to cars, we produce and rapidly consume an enormous diversity of goods. A hidden cost of this abundance is the management of its by-products -- the complex soup of hazardous chemicals generated by heavy industry, as well as the more benign leftovers in our household trash. If we are to protect human health and the environment, we must manage these wastes wisely.

By any measure, the amount of waste generated in the U.S. is staggering. From 1970 to 1994 U.S. solid waste production increased by one-third from 123 million tons annually or 3.3 pounds per person per day to 209 million tons or 4.4 pounds per person per day. In 1993, industry managed 258 million tons of hazardous waste and over 7 billion tons of non-hazardous waste. The EPA has identified over 650 chemicals and chemical categories that pose the greatest challenge to the protection of air, water, and land; EPA's efforts to track releases indicate that industry released over 1.6 million tons of these substances in 1992. The magnitude of these figures, however, can mask the progress that EPA has made in managing waste.

THE WASTE MANAGEMENT HIERARCHY

The EPA and state regulators have introduced and begun to implement a philosophy of waste management that emphasizes prevention over disposal. Specifically, the EPA has promoted a "hierarchy" of waste management:

- **Prevention:** Industry and households should adopt measures that reduce the amount of waste generated. This is often referred to as source reduction or waste minimization.
- **Recycling:** Pollution that cannot be prevented should be recovered and recycled.
- **Treatment:** Pollution that cannot be prevented or recycled should be subjected to treatment procedures that render the waste harmless.
- **Disposal:** Disposal or release into the environment (e.g., landfilling) should be used only when other options are not feasible; disposal methods should be environmentally sound.

Through policy and regulatory enforcement, the EPA seeks to promote approaches higher in this hierarchy. First, the EPA has made progress in reducing waste generation and toxic releases. For wastes that are generated, the EPA has helped promote recycling and improved handling. Finally, the EPA is steadily addressing the expensive and complex task of cleaning up after historical contamination -- the legacy of past waste management practices that predated the hierarchy of reduced generation, recycling and safe disposal.

Pollution Prevention First

Putting prevention first has required a revolution in the way that industry thinks about production and waste management and in the way that EPA regulates. Eliminating waste or toxics releases requires that industry abandon the "end-of-pipe" environmental management approach; instead, industry must redesign production processes from the ground up. For its part, EPA has recognized that it must forsake regulatory approaches that force industry into one-size-fits-all solutions and instead allow room for innovation.

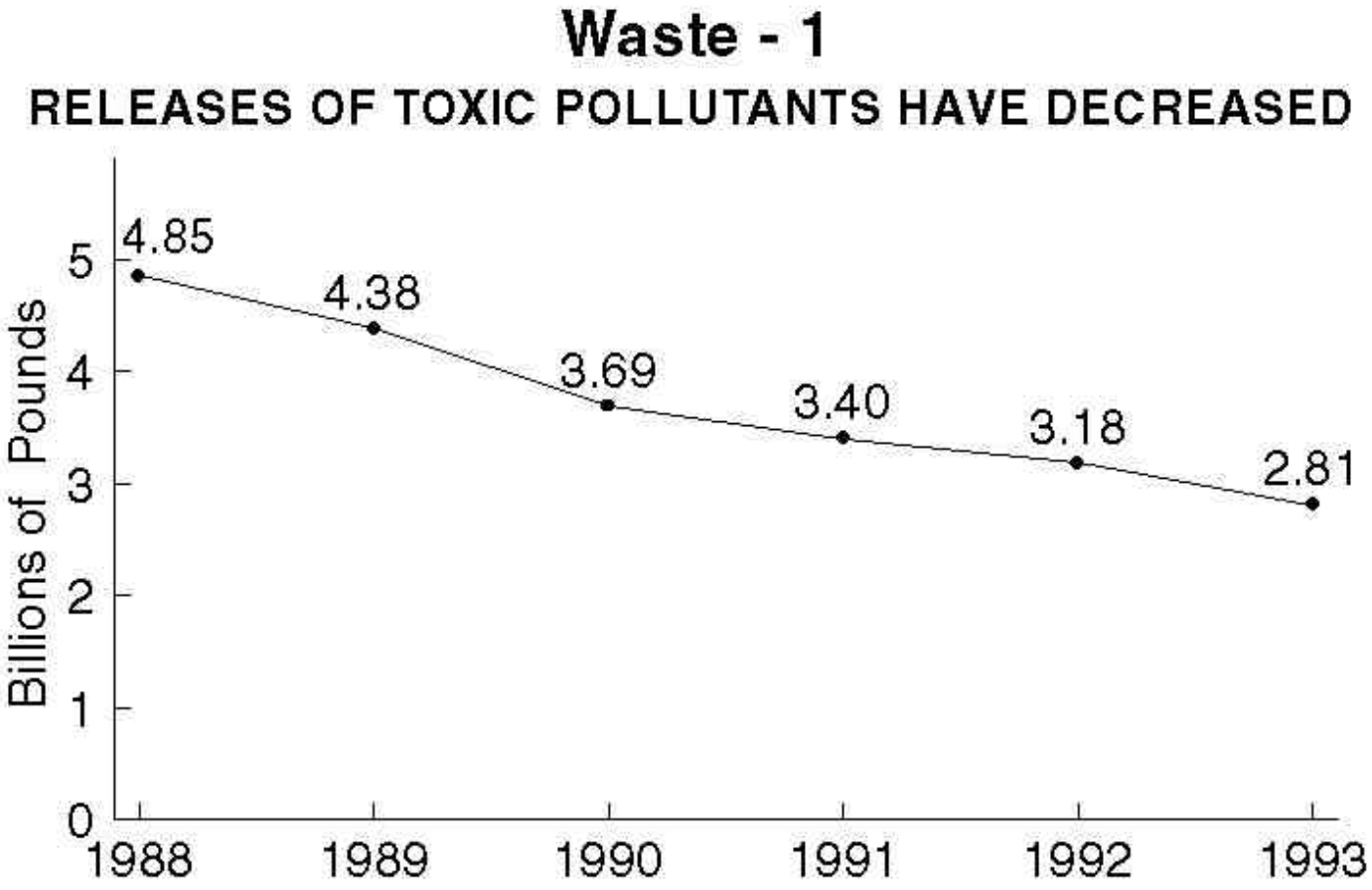
Promoting Safer Chemicals, Processes, and Technologies

The EPA recognizes its role in pushing for the use of safer chemicals and processes in the basic operations of the industrial sector. A new EPA chemicals program plays a major role in preventing chemicals that will pose significant risks from entering the marketplace. For chemicals already in commerce, the EPA is beginning to examine clusters of related chemicals, rather than single chemicals, in evaluating alternative products and processes. Industries are encouraged to shift to products and processes that are safer and more effective.

Economic Gain Through Waste Minimization

Let's look at some data that illustrate progress already made.

The 1986 Emergency Planning and Community Right-to-Know Act established the Toxic Release Inventory (TRI), a database on releases, off-site transfers and generation of over 650 chemicals and chemical categories from large manufacturing facilities. The TRI data suggest that overall releases of toxic chemicals to the environment were reduced by 43 percent between 1988 and 1993 (see Waste-1). Most of this reduction is attributable to air emissions (see Waste-2). However, toxic releases via two other media have also been reduced significantly. Chemical releases through underground injection, the forcing of liquid wastes into deep wells, have been reduced by 57 percent, while other releases to land (e.g., landfilling) have decreased by 44 percent.



Source: *U.S. EPA, Toxics Release Inventory, 1993 as reported in Proposed Environmental Goals for America.*

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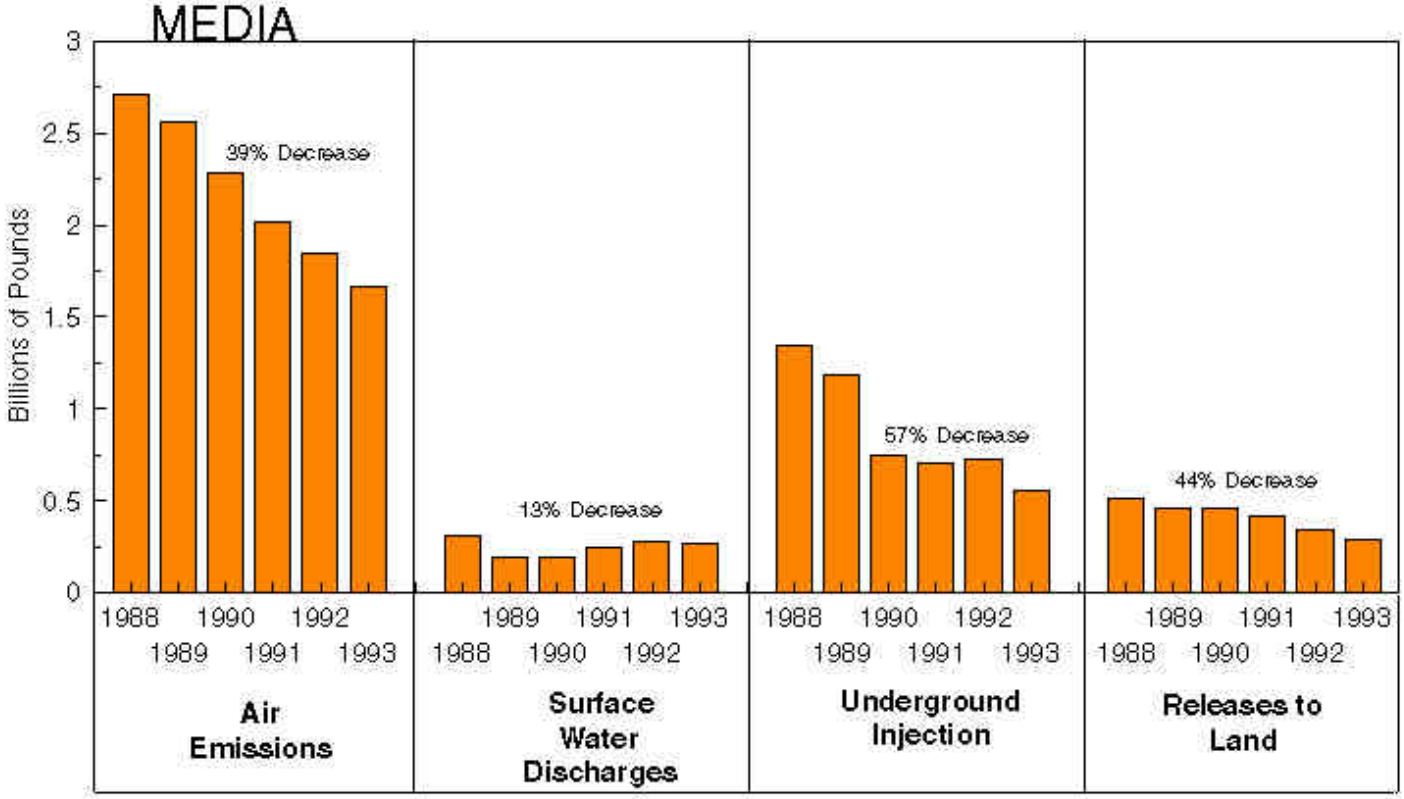
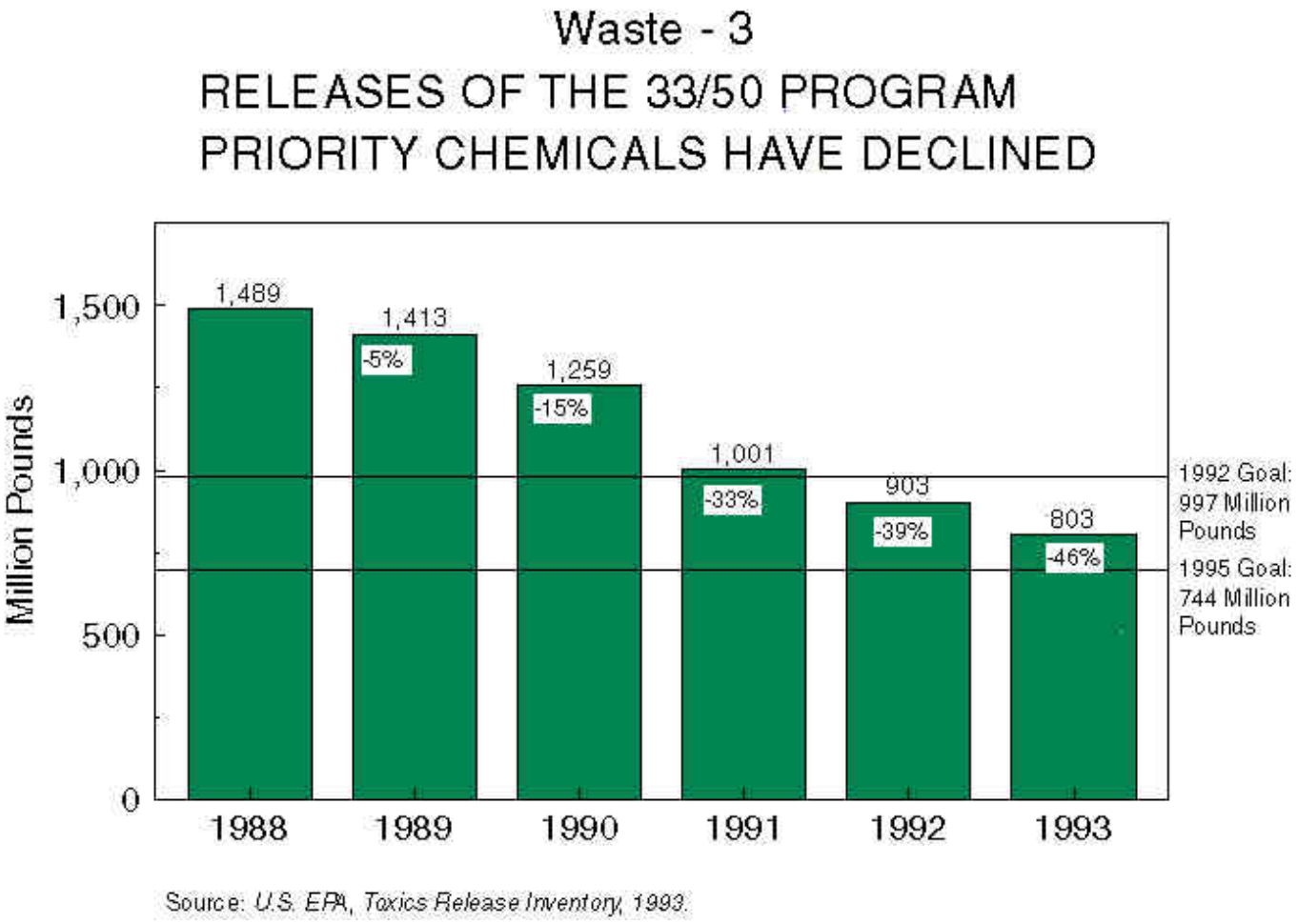
RELEASES OF TOXIC POLLUTANTS FOR ALL MEDIA



Source: *U.S. EPA, Toxics Release Inventory, 1993.*

Further evidence of pollution prevention is seen from EPA's 33/50 Program, a voluntary initiative that seeks to reduce generation and releases of 17 priority TRI chemicals selected on the basis of toxicity and opportunity for achieving pollution prevention. Releases of these priority chemicals declined by more than 46 percent between 1988 and 1994 (see Waste-3).



Community Clips *Community Based Environmental Protection*

Frequently, the most effective way to reduce risk from pesticides is to substitute a less harmful one for a more harmful one, to reduce the use of a pesticide, or to eliminate the use of the pesticide. EPA's program for reducing pesticide risks is a good example of pollution prevention through substitution of safer pesticides and through use reduction. Since the early 1970s, the Agency has banned or eliminated use of over 230 pesticides and 20,000 pesticide products. Through the Pesticide Environmental Stewardship Program, EPA, in conjuction with USDA and FDA, is working with pesticide users to reduce pesticide risk and use in both agricultural and non-agricultural settings. Through voluntary public-private partnerships, both private sector partners and the federal government are making commitments to adopt techniques that enhance pest management and reduce pesticide risk of exposure and use. To date, 37 Partners have signed up, including the Department of Defense, which has committed to reduce its pesticide use by 50 percent by the end of FY 2000.

Community Clips *Reducing Ecological Threats Through Pesticide Control*

Community Clips *Pollution Prevention Through Pesticide Management*

Protecting the Public

The EPA has made significant progress in the reevaluation of older pesticides, many of which were first registered many years ago, before today's more rigorous health and environmental standards. Thousands of scientific studies have been evaluated, often resulting in new requirements and restrictions to reduce pesticide risks. Yet, nearly half of these older pesticides remain to be reviewed.

Protecting Agricultural Workers

Another significant effort aimed at reducing risk from pesticide poisonings is EPA's Worker Protection Standard program. The implementation of this Standard represents a major strengthening of national efforts to safeguard almost four million agricultural workers and pesticide handlers. It requires agricultural employers to ensure that employees receive basic training in pesticide safety and to notify workers when pesticides are applied. Employers must also provide washing facilities and supplies if workers are likely to come into contact with pesticides, and provide and maintain protective equipment to reduce potential health risks due to pesticide exposure in agriculture.

Protecting Children from Pesticide Hazards

EPA is committed to ensuring that potential health risks to infants and children are consistently and explicitly evaluated in all its programs. Through the use of modern computer systems, EPA performs dietary risk assessments specifically for various age groups of children, including infants, based on age-specific food consumption survey data collected by the U.S. Department of Agriculture.

Through an extensive outreach program, and through EPA's participation in the Poison Prevention Week Council's widespread network and annual press events, EPA's fact sheets on "Pesticides and Child Safety" and "Using Insect Repellents Safely" in both English and Spanish are distributed to thousands of hospitals, clinics, pharmacies and the general public every year.

Public Access to Pesticides Information

The National Pesticide Telecommunications Network (NPTN) (800) 858-7378 has been instrumental in preventing potentially dangerous situations involving pesticides for both people and their pets. The service provides impartial factual information about pesticides including information on pesticide products, their health and environmental effects, as well as referrals for investigation of pesticide incidents and emergency treatment. NPTN will soon be available on the Internet. On average, NPTN responds to about 25,000 calls annually.

Pollution Prevention Through Emergency Planning and Community Right-to-Know

Finally, prevention of toxic chemical spills and other accidents is a priority for the Agency. The Emergency Planning and Community Right-to-Know Act of 1986 requires states to establish state and local planning groups to develop emergency response plans for each community. To date, states have established over 3,400 Local Emergency Planning Committees (LEPCs). Facilities are required to make information available to the public through LEPCs on the hazardous chemicals present on site. A 1994 nationwide survey indicated that 79 percent of the LEPCs are functioning and most of these have completed emergency response plans and exercised them within their communities. Anecdotal information suggested that these preparedness efforts have contributed to reduced chemical inventories and improved communities' ability to respond to chemical emergencies.

While emergency planning is critical, preventing accidents is the ultimate goal. Through the Accidental Release Information Program and the Chemical Safety Audit Program, EPA has begun collecting data on the causes of accidents, steps facilities can take to prevent recurrences, and successful practices companies use to mitigate and prevent accidents.

RESPONSIBLE WASTE MANAGEMENT

While prevention stands as the first priority today, EPA's efforts in the past focused primarily on the other three levels of the hierarchy -- recycling, treatment and proper disposal of waste. Some historical perspective can help us assess progress

in these areas.

In 1976, Congress passed the Resource Conservation and Recovery Act (RCRA), which in 1984 was significantly amended through the Hazardous and Solid Waste Amendments (HSWA). RCRA and HSWA divided the universe of waste and hazardous materials into specific categories and established programs to address each.

A key RCRA objective was to identify those industrial wastes with characteristics that make them of special environmental concern (e.g., explosiveness, toxicity). These wastes are defined as "hazardous" under Subtitle C of RCRA and are subject to special regulations designed to track their generation and transport and to ensure their safe treatment and disposal. In addition, facilities that treat, store or dispose of hazardous wastes must meet rigorous state and federal permit requirements. Wastes posing lesser risks are governed by state authorities; these wastes include non-hazardous industrial waste and municipal solid waste (household trash). Other RCRA programs focus on particular categories of hazardous materials management: most notably, EPA and the states implement regulations requiring that underground storage tanks used for petroleum and other dangerous substances meet strict design specifications to minimize the risk of leaks.

EPA's progress in these waste management areas (hazardous waste, non-hazardous waste and underground tanks) is demonstrated by the data.

Hazardous waste: Over the years, EPA has made steady progress in identifying those wastes considered to be "hazardous," and therefore subject to more protective management standards (see Waste-4). Between 1989 and 1991, the quantity of generated waste defined as hazardous increased by over 100 million tons, due largely to the 1990 introduction of the Toxicity Characteristic Rule, which identified wastes considered to be hazardous due to their toxic characteristics.

Source: *The Biennial RCRA Hazardous Waste Report, U.S. EPA, 1994.*

Adherence to the waste management hierarchy is apparent in recent hazardous waste trends. There has been an increase in hazardous waste recycling and recovery between 1989 and 1991 (see Waste-5). Overall, waste going to recovery processes more than doubled (by weight), with the greatest changes coming from recovery of solvents, highly toxic (often carcinogenic) chemicals commonly linked to past pollution of surface water and ground remove space water.

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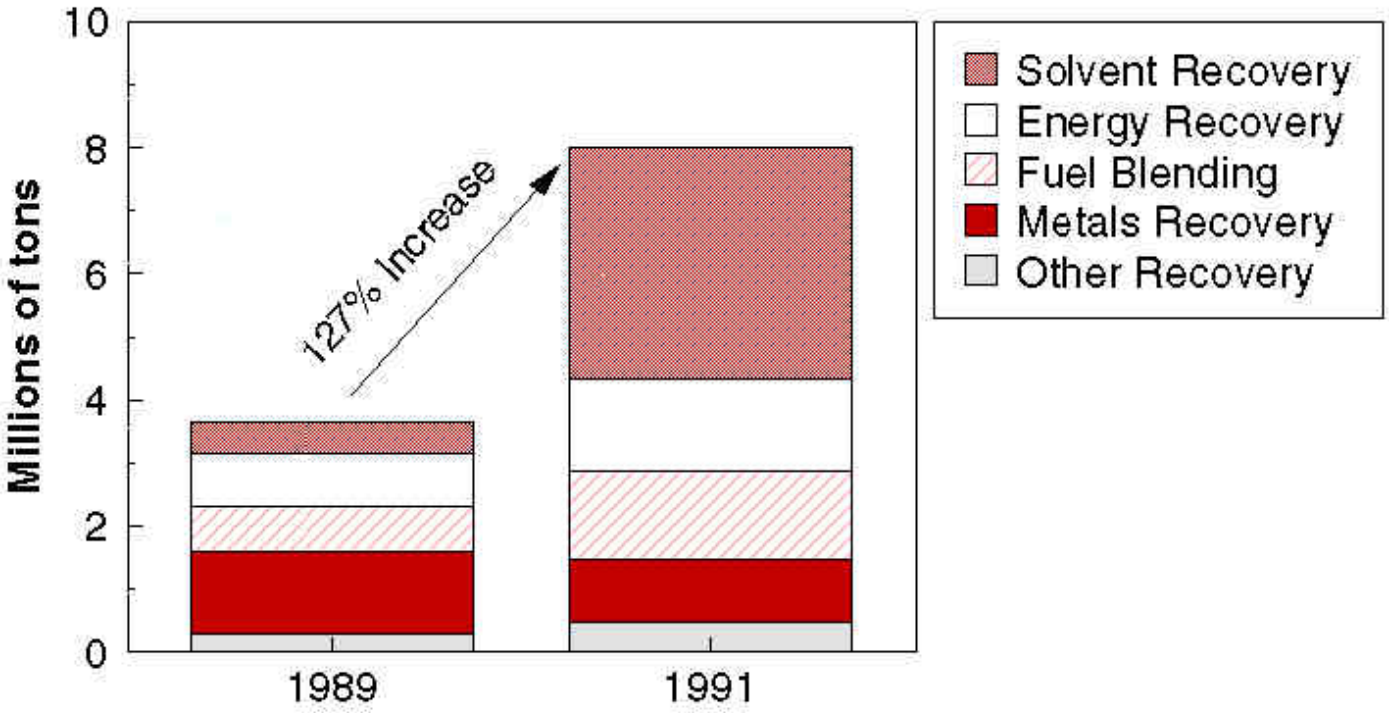
RECYCLING OF HAZARDOUS WASTE HAS INCREASED



Source: 1989 and 1991 Biennial RCRA Hazardous Waste Reports as reported in *EI Digest*, March 1995; Another Look at the EPA's 1991 Biennial Report.

Land disposal of hazardous waste has become much less prevalent, partly as a result of land disposal restrictions (LDRs) instituted by EPA beginning in 1986. These rules require treatment of many wastestreams prior to disposal in a landfill or other land-based disposal unit. Landfill disposal decreased by about 25 percent between 1989 and 1991. In the same period, underground injection decreased by 20 percent. Between 1991 and 1993, landfill disposal increased by about 15% and underground injection by about 5%, but these trends should be considered in light of the additional 100 million tons of waste brought under hazardous waste management regulations by the Toxicity Characteristic Rule in 1990.

Non-hazardous waste: EPA efforts have also improved the management of non-hazardous waste, particularly household trash. From an administrative standpoint, there has been an increase in the number and quality of state programs created to manage trash. For example, the number of states, territories and tribes with final EPA approval of municipal solid waste landfill programs increased from one in 1993 to 47 in 1995 (see Waste-6). Through curbside and drop-off recycling programs, households have increased recycling of materials such as paper, glass, steel and plastic; households have also increased composting of yard waste. As a result, the U.S. has moved from an overall recovery rate of 7 percent in 1970 to 24 percent in 1994. Recycling and the growth of trash combustion have contributed to a decrease in the share of trash going to landfills from a high of 82 percent in 1980 to only 61 percent in 1994 (see Waste-7).

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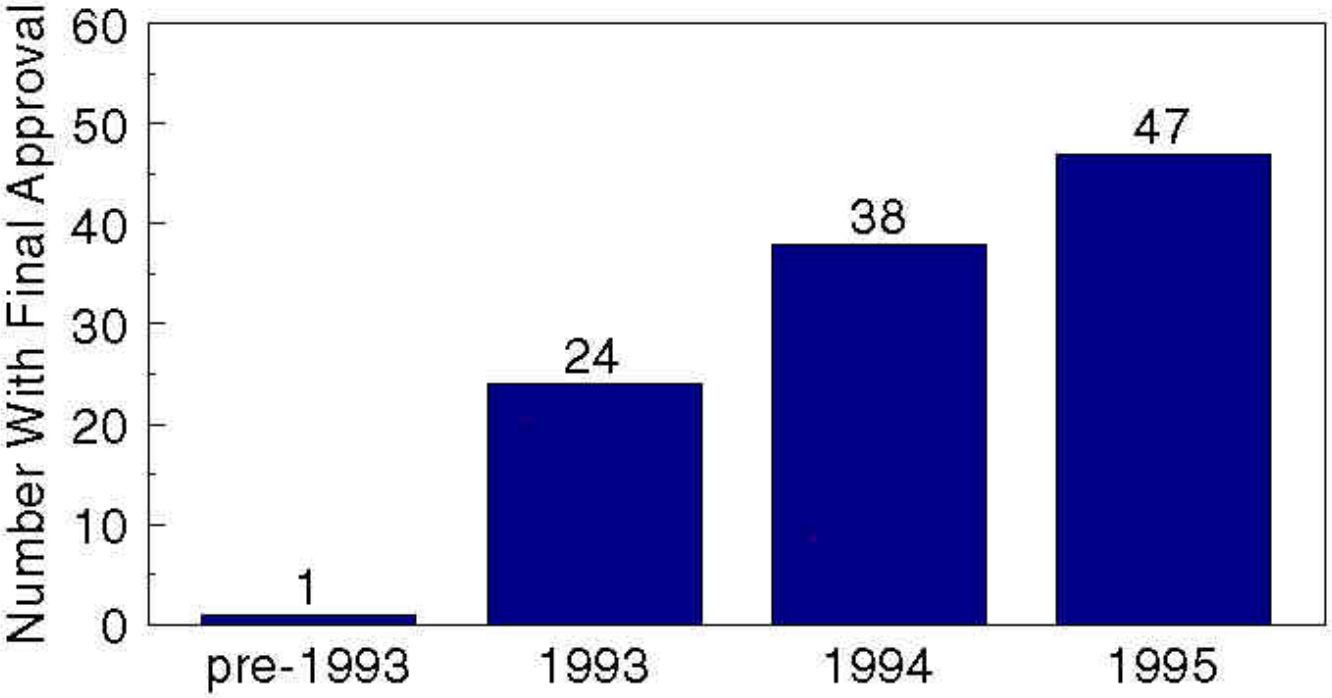
MORE STATES/TRIBES HAVE EPA-APPROVED MUNICIPAL SOLID WASTE LANDFILL PERMIT PROGRAMS



Source: *U.S. EPA, Municipal Solid Waste Landfill Permit Program Approval Status Report, 1995*

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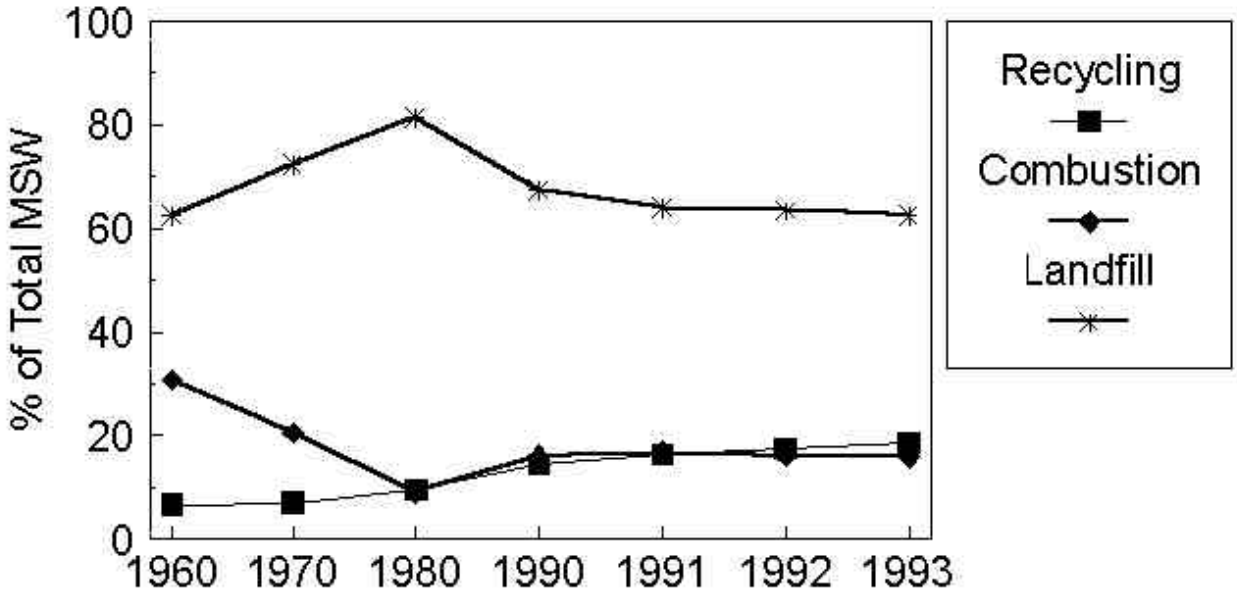
WE RECYCLE MORE TRASH AND LANDFILL LESS



Source: *Characterization of Municipal Solid Waste in the United States: U.S. EPA 1994 Update.*

S.C.Delaney/U.S.EPA

Underground tanks: Underground tanks used to store petroleum or certain hazardous substances are a major concern because of their potential to leak and contaminate ground water, the source of drinking water for nearly half of all Americans. A leaking underground storage tank (UST) can also pose a risk of fire or explosion. The EPA has developed regulations requiring tank owners to prevent and detect leaks from USTs and to clean up contaminated sites. By December, 1998, all USTs must be either replaced with new tanks that meet certain standards, older tanks that have been upgraded with corrosion and spill prevention equipment, or properly closed. UST cleanups are also well underway. Since 1990, the EPA and states have overseen or completed over 141,000 cleanups. The EPA continues to promote approaches that make cleanups faster, more effective and more economical.

CLEAN UP

Reducing waste generation and managing waste safely are relatively new practices in the context of our country's economic and industrial history. For decades, industry disposed of waste either without regard to environmental impacts, or in ways that appeared safe at the time, but were, in fact, environmentally unsound.

Beginning in the 1970s, Americans began to take note of the legacy of this past behavior. Well publicized incidents such as the discovery of extensive contamination at Love Canal, New York spurred lawmakers to action. The Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980. This law, more commonly known as "Superfund," created a program to clean up abandoned hazardous waste sites across the country. Funded by the responsible companies as well as by taxes on chemical and petroleum production, the EPA manages clean ups at Superfund sites. The Resources Conservation and Recovery Act (RCRA) assures proper closure and clean up of environmental releases by owners and operators of waste storage, treatment, and disposal facilities, thereby preventing future Superfund sites.

Disaster Averted: Love Canal on the Road to Recovery

While clean ups are complex and often require long-term remedial measures (e.g., treatment of contaminated ground water), the EPA has made significant progress. The EPA ranks Superfund sites according to the risk posed to human health and the environment and places the worst sites on the National Priorities List (NPL). Of the roughly 1,300 sites on this list, 95 percent have clean up operations underway and 349 (26 percent) have clean-up completed. Superfund cleanup is a long complex process, and more cleanups have been completed in the last two years of the program than in its first decade.

Throughout the nation thousands of abandoned and potentially contaminated industrial properties lie unused and undeveloped. Known as "Brownfields", these properties possess many good development prospects such as access to transportation and labor. Furthermore, many of these sites are located in depressed areas that would benefit greatly from re-development. The potential for contamination, however, presents a major barrier. Current environmental laws generally

hold existing landowners responsible for clean-up costs -- even if they did not contaminate the land. Banks are also hesitant to provide development loans for fear that they might become owners of the property if developers default.

The Brownfields initiative removes many of these barriers and seeks to link environmental health to economic development. One way this is done is by reducing the stringency of clean-up to levels that are considered safe in an industrial setting. The EPA and the states are also providing Brownfield developers with financial assistance as well as guarantees that additional clean-up will not be required after the site is in use. Now, just over a year into the program EPA is exploring ways to expand the role of the Brownfields approach in other areas of environmental protection.

Reclaiming Contaminated Land

MORE CHALLENGES AHEAD

Even as we make progress in managing waste and toxics, additional challenges become clear. Two challenges are most pressing: **(1) further reduction and recycling of waste;** and **(2) introduction of waste management programs that reduce regulatory burdens and encourage economic development.**

Reduction of Medical Waste: Hospitals Save Money Under EPA Initiative

Reduced Generation and Increased Recycling: The EPA has continued to emphasize its commitment to pollution prevention. In November 1994, the Agency announced the final Waste Minimization National Plan, a blueprint for reducing the generation and release of toxic pollutants. The Plan has a goal of reducing the presence of the most harmful constituents in waste by 25 percent by the year 2000, and 50 percent by the year 2005. To help achieve these goals, the EPA is working to encourage pollution prevention through a variety of innovative programs and policies. These include the following: 1) outreach tools which will help waste generators select priority wastes to target for reduction, 2) opportunities to reduce the amounts of wastes being burned and 3) outreach electronic bulletin boards designed to inform companies of pollution prevention alternatives.

Likewise, the Agency is working to encourage reduced use of toxic chemicals such as pesticides. For example, integrated pest management encourages more controlled application techniques, improved timing of planting and other natural pest control approaches.

In addition to waste prevention, the EPA is also looking for ways to enhance waste recycling. One set of efforts involves removing legal obstacles to environmentally sound recycling of hazardous waste. For example, EPA's Universal Waste Rule streamlines the requirements for nickel-cadmium batteries and other materials which will serve to promote increased recycling. Furthermore, the EPA is currently working on a major new initiative that would revise the definition of solid waste under RCRA and streamline and simplify the stringent hazardous waste rules for environmentally sound recycling of hazardous waste.

Reducing Economic Burdens: A second major challenge is to pursue waste management and clean up while limiting the economic burden placed on businesses, cities and households. The EPA's strategy is to use regulatory resources to target the most toxic wastes and contaminated sites, while providing more flexibility in managing less toxic wastes and sites. For example, observers have noted that fear of Superfund liability may discourage development of older industrial areas. In response, the EPA has introduced the Brownfields initiative, a program designed to encourage redevelopment of areas that pose little or no risk to health and ecosystems. The Agency is working with state and local officials to identify these low-risk sites, clarify the liability of municipalities and other government entities and develop guidance on simplified

cleanup requirements.

Over the years, the EPA has engaged in several rounds of Superfund reforms, in an effort to make waste site cleanups faster, fairer and more efficient. The most recent round of Superfund improvements aim to control costs while protecting public health by assuring more cleanup consistency, streamlining processes to save time and money, creating new choices for cost-effective cleanup options and encouraging economic redevelopment. Other reforms aim to decrease litigation and reduce both costs and clean-up delays by increasing fairness in the enforcement process. A third set of reforms aims to provide more and better information, along with opportunities for involvement in cleanup decisions, to citizens, state and local governments, and industry, to encourage responsible cleanup choices that reflect local needs and preferences.

The EPA is seeking greater economic efficiency in the RCRA hazardous waste management programs as well. For example, the Agency recently proposed the Hazardous Waste Identification Rule (HWIR). The objective of HWIR is to exempt from the stringent hazardous waste rules of industrial wastestreams that have relatively low concentrations of hazardous chemicals and, therefore, pose little risk to health and the environment. The recently enacted Land Disposal Program Flexibility Act eliminates stringent and costly treatment requirements for certain low risk wastes that are regulated under other laws. This RCRA "fix" will eliminate an unnecessary and duplicative layer of costly regulation, yielding tens of millions of dollars in savings to private industry. Likewise, the EPA is currently working to reduce the paperwork associated with the "manifest" by which shipments of hazardous waste are tracked.

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